

# LAW ENFORCEMENT MUTUAL AID PLAN (SAR) ANNEX



## MUTUAL AID GUIDELINES

### SEARCH AND RESCUE UNDERWATER

June 2, 2005

California Governor's Office of Emergency Services  
Law Enforcement Branch  
Search and Rescue Mutual Aid – Underwater Guidelines

ACKNOWLEDGMENT

This document is the product of a cooperative effort of an assembled Search and Rescue Underwater Working Group and the California State Sheriff's Search and Rescue Coordinators.

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## **Introduction**

Pursuant to the California Government Code, Chapter 7 of Division 1 of Title 2, "The Emergency Services Act," the Governor's Office of Emergency Services (OES), Law Enforcement Branch manages and maintains the State of California Search and Rescue Mutual Aid Program. This includes the publication of plans pertaining to search and rescue mutual aid. This publication, The California OES SAR Mutual Aid Plan, serves as an annex to the California OES Law Enforcement Mutual Aid Plan.

In order to refine the State's Search and Rescue Mutual Aid Program, the OES Law Enforcement Branch assembled California's 58 County Sheriffs Search and Rescue Coordinators, as well as California's State and Federal SAR Cooperators. This group of interested agencies is called the "State Sheriffs Search and Rescue Coordinators." The main objective of this group is to collectively review and address statewide SAR issues to improve the effectiveness and efficiency of the State's SAR Mutual Aid Program.

One of the main issues identified was the existence of multiple and inconsistent standards that affect the SAR discipline, specifically mutual aid SAR responses. The lack of statewide consistency in how SAR resources were evaluated and categorized made it difficult for SAR resources to be used as a mutual aid resource. This issue was addressed in detail by the State Sheriffs SAR Coordinators. Their objective was to create mutual aid guidelines that met or exceeded existing applicable standards while creating effective, efficient statewide criteria for mutual aid SAR responses. These guidelines are intended to define SAR proficiencies solely for mutual aid resources.

1. These guidelines contain information for law enforcement agencies to consider when addressing the broad range of issues related to search and rescue mutual aid. These guidelines do not constitute a policy, nor are they intended to establish a standard for any agency. OES is sensitive to the needs for agencies to have individualized policies that reflect concern for local issues. OES intends these guidelines to be a resource for law enforcement agencies that will provide maximum discretion and flexibility in the development of individual agency policies.

The creation of California's SAR Mutual Aid Guidelines encompass all potential SAR disciplines and are developed as follows:

1. The State Sheriffs SAR Coordinators identify the guideline discipline need.
2. The State Sheriffs SAR Coordinators elect one of their fellow coordinators to chair the guideline creation process.
3. The State Sheriffs SAR Coordinators identify and task a group of subject matter experts into a "Specialist Working Group."
4. The Specialist Working Group creates the guidelines based upon their knowledge and experience and submits them back to the coordinators for review, recommendation, and/or approval.
5. Once approved by the coordinators, and reviewed by OES Administration and Staff Counsel, the coordinators present the guidelines to the California State Sheriffs Association (CSSA) for their review, recommendation and/or approval.
6. Once approved by CSSA, the guidelines become part of the OES California Law Enforcement Mutual Aid Plan – SAR Annex.

Effectiveness and efficiency is achieved as California's SAR Mutual Aid Guidelines are created by California's SAR experts, for California's Sheriffs SAR Coordinators, and approved by the Sheriffs of California, all for the benefit of those who become the subjects of search and/or rescue in California's SAR environments.

The following guidelines include “typing” of both the SAR environment as well as the SAR resource. They are designed to match the conditions, environment, and possible length of deployment (normal operational periods should be 12 hours) as determined by the mutual aid requestor and the minimum equipment, experience, and skill level the responding agency should consider when sending SAR personnel.

The goal of “typing” is to be able to identify the largest number of SAR resources while minimizing the risk of placing an unsuitable SAR resource in an unsafe situation. The responding agency’s liaison or leader shall have final approval of any assignments their personnel are asked to perform.

Volunteer SAR personnel should be properly registered as Disaster Service Workers (DSW). DSW registration will ensure that the volunteers are eligible for worker’s compensation coverage if they should be injured and it provides additional liability protection for the volunteer and the government agency.

NOTE: The endeavor of Search and Rescue necessitates response into difficult and unpredictable circumstances in widely varied and many times hazardous terrain. These guidelines are intended to assist Search and Rescue Coordinators in identifying appropriate emergency response resources to effect searches and rescues in the most expeditious manner possible while considering known and unknown hazards. These guidelines are not intended to address all eventualities. Rather they are a set of tools derived from collective knowledge to address the task at hand. Search and Rescue is inherently dangerous and participants respond with knowledge of the associated risks.

It is the responsibility of agencies responding to California Search and Rescue Mutual Aid requests to provide qualified personnel and equipment that meet or exceed the recommended level of skills and capabilities stipulated in these guideline documents.

The California SAR Mutual Aid Guidelines are only minimum guidelines and circumstances that are unique to a particular search and rescue mission may dictate that additional or higher skills and qualifications may be necessary for the safety of the searcher and for successful search and rescue operations.

### **Summary**

An Underwater Recovery Team is capable of conducting diving operations in various underwater and weather conditions. There are basic skills that all team members should have before going into the field during an underwater operation. All Dive Teams should be fully self-contained with the ability to respond to remote locations. A team consists of a minimum of six personnel, one of which is a team leader, who may be the agency liaison if only one dive team is sent; otherwise an agency liaison will be present as well, separate from the team leader.

The following is a general description of four different underwater environment 'types' and suggested minimum abilities for underwater operations within each area type.

Underwater Environment Types			
Type 1 Extreme Underwater conditions	Type 2 Difficult Underwater Operations/skill sets	Type 3 Advanced Underwater Operations	Type 4 Basic Underwater
<u>Extreme Conditions:</u>  Contaminated Water, Ice Diving	<u>Difficult Conditions:</u>  Deep (Shallower than 130 fsw), Cold (colder than 48F), Surf or Current (greater than 1mph/.85kn), Black Water	<u>Advanced Conditions:</u>  Deep (Shallower than 100 fsw), Altitude, Night Diving	<u>Basic Skills:</u>  Shallower than 60 fsw, Underwater Nav.

Specialized Teams, Capabilities and/or Equipment maybe available and should be requested through OES. These specialized skills/capabilities may include:

- Advanced Altitude (>5,000 feet above sea level)
- Air Compressor
- Deeper than 130 fsw
- Diver Propulsion Vehicles
- Explosive Ordnance Operations
- Heavy Salvage/Lift Bags
- Portable Sonar
- PWC / Rescue Board
- Surface Supplied Air
- Towable Motorized Vessel
- Underwater Cave or Cavern
- Underwater Communications / Full Face Mask
- Underwater Metal Detector
- Underwater Sonar or Locating Systems
- Underwater Video / ROV

All diving operations should assume a standard 12 Hour Operational Period. All dive teams should be able to conduct a minimum of one dive at one location during this period. Multiple locations or for incidents requiring multiple dives, plans must be made accordingly with the responding agencies and the appropriate number of teams requested. It is the responsibility of the requesting agency to have a medical transport/evacuation plan for dive operations. This plan should be constructed with consultation of the responding Dive Team Leader.

## **Appendix 1**

It is the intent of this appendix to set performance guidelines for the use of Underwater Dive Teams in the State of California where the operation of such teams would fall under the jurisdiction of the California Governor's Office of Emergency Services "Mutual Aid Guidelines." These guidelines are meant only for the performance of Underwater Mutual Aid requests.

### **General Definitions**

Altitude: 1,000 –to- 5,000 feet above sea level.

Advanced Altitude: Greater than 5000 feet above sea level.

ATA: Atmosphere absolute.

Black Water: Zero visibility - generally less than 3 inches of visibility.

Bottom Time: The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent.

Cold Water Diving: Diving in 48 degrees F or colder. *Requires specialize equipment and protective wear.*

Confined Space / Overhead Environment Diving: Any diving involving penetration into an area where there is not direct access to the surface. *Requires specialized equipment and training.*

Contaminated Water / Hazardous Materials (HazMat) Diving: Requires more extensive protective equipment and training than the standard wetsuit or SCUBA equipment provides. *Requires training and certification.* (Generally limited contact with vehicular petroleum products in small single vehicle quantities, which are considered Type 3 or Type 2 conditions, are not considered a contaminated water operation).

Current Diving: Water flow of greater than 1 mph / .85kn. Generally requires experience/certification.

Cylinder: A pressure vessel for the storage of gases.

Decompression Chamber: A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving systems used to decompress divers and to treat decompression sickness.

Decompression Sickness: A condition with a variety of symptoms which may result from gas and bubbles in the tissues of divers after pressure reduction.

Decompression Table: A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

Deep Diving: Deeper than 60 feet seawater. *Generally requires experience / certification.*

Dive Location: A surface location or vessel from which a diving operation is conducted.

Diver: A public safety officer or volunteer working in water that is using apparatus, including snorkels, which supplies breathing gas at ambient pressure.

Diver-Carried Reserve Breathing Gas: A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.

Dive Site: The physical location of a diver during a dive, which may be on the surface or underwater.

Dive Team: Divers and support personnel who are exposed to or control the exposure of others to hyperbaric conditions, including the designated person in-charge.

Dive Team Medical Representative: An individual that is familiar with the medical condition of the dive team members and is knowledgeable with, and trained in, dealing with specific "dive related" medical issues (e.g. training by a nationally recognized SCUBA certification agency to Rescue Diver or equivalent).

Diving Mode: A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

FSW: Feet of seawater (or equivalent static pressure head).

Hyperbaric Conditions: Pressure conditions in excess of normal atmospheric pressure at the dive site.

Ice Diving: Any overhead obstruction from ice formations on the surface of the water. *Requires specialize equipment and protective wear.*

Limited visibility: Generally less than 3 feet of visibility.

Maximum Working Pressure: The maximum pressure to which a containment device may be exposed under standard operating conditions.

Mixed-Gas Diving: A diving mode in which the diver is supplied in the water with a breathing gas other than air.

No-Decompression Limits: The depth-time limits of the "no-decompressions limits and repetitive dive group designations table for no-decompression air dives." U.S. Navy Diving Manual or equivalent limits, which the employer can demonstrate to be equally effective.

**Pressure-Related Injury:** Any injury resulting from pressure disequilibrium within the body as the result of hyperbaric exposure such as: decompression sickness, pneumothorax, mediastinal emphysema, air embolism, or subcutaneous emphysema.

**PSI:** Pounds per square inch (gauge).

**Risk/Benefit Analysis:** A detailed risk assessment of the operation. Is the benefit derived from conducting the dive operation worth the risk to personnel involved.

**Safety Diver:** A diver at the dive location capable of rendering immediate assistance to a diver in the water.

**SCUBA Diving:** A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

**Surface-Supplied Air Diving:** A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

**Surf & Surge Zone:** An area in Open Water diving affected by tidal and wave action. Diving in these conditions requires experience beyond Basic Open Water training due to conflicting currents in both vertical and horizontal dimensions. These skills sets are especially critical in coastal areas abutting cliffs, around man-made structures (i.e. wharfs, jetties, oil rigs, etc.) or other places where there is danger of the divers being propelled into stationary and immovable objects.

**Treatment Table:** A depth-time and breathing gas profile designed to treat decompression sickness.

**Umbilical:** The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

**Volume Tank:** A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

**Working Pressure:** The normal pressure at which the system is designed to operate.



### **Individual Diver Skills**

It is recommended that Individual Divers have the following skills. "X" indicates recommended skills for each type of Environment/Conditions.

	<b>Type 1</b>	<b>Type 2</b>	<b>Type 3</b>	<b>Type 4</b>
Basic National Scuba Certification	X	X	X	X
Buoyancy Control	X	X	X	X
Comfortable in depth to 60 fsw	X	X	X	X
Contaminated Water (basic awareness)	X	X	X	X
Current 1 <sup>st</sup> Aid / Basic CPR	X	X	X	X
Fresh Water Familiarity	X	X	X	X
Helicopter Operations (familiarity)	X	X	X	X
Knowledge of Basic ICS	X	X	X	X
Radio Communications (familiarity)	X	X	X	X
Salt Water / Surf & Surge (familiarity)	X	X	X	X
Scene / Evidence Preservation (familiarity)	X	X	X	X
Underwater Navigation	X	X	X	X
Altitude Diving (>1000' and <5000')	X	X	X	
Deep Diving III (>60 fsw to <100 fsw)	X	X	X	
Explosive Ordnance Search / Recognition	X	X	X	
Line Tending (search patterns)	X	X	X	
Low Visibility (visibility <3')	X	X	X	
Night Diving	X	X	X	
Basic Lift / Recovery	X	X		
Black Water (zero visibility)	X	X		
Cold Water Diving (colder than 48F)	X	X		
Current Diving (>1mph / .85 kn)	X	X		
Deep Diving II (>100 fsw to <130 fsw)	X	X		
Surf & Surge Operations	X	X		
Contaminated Water Operations	X			
Ice Diving (ice formations on surface)	X			

### **Underwater Dive Team Composition**

Dive Teams will have the ability, and shall provide their own equipment, to perform operations in the respective environment types, including but not limited to the following composition:

- Agency Liaison
  - single team, Liaison may be Team Leader
  - multiple team response requires a separate Liaison for each team
- Dive Team Medical Representative
- Dive Team Leader
  - may also be medical representative
- Dive Personnel:
  - Primary Diver
  - Safety Diver
  - Backup Diver (recommended)
- Surface Support Personnel:
  - Recorder
  - Line Tender (as necessary)

### **Recommended Safety Guidelines for Underwater Operations**

1. Backup or Secondary Diver with a separate Safety Diver.
2. Equipment rated for the conditions.
  - a. Underwater Communications (Some form of communications, such as: underwater hard line or wireless or line signals between the diver(s) and surface personnel).
  - b. Surface supplied air source.
3. Personal Protective Equipment (PPE) for the conditions.

Suggestions may be:

  - a. Helmets or Full Face Mask (FFM).
  - b. Drysuit for exposure.
  - c. E.P.A. equivalent or greater recommended PPE for Contaminated Water / HazMat operations.